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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,862	08/28/2003	Der-Zheng Liu	TOP 312	6352
23995	7590	09/12/2007		
RABIN & Berdo, PC 1101 14TH STREET, NW SUITE 500 WASHINGTON, DC 20005			EXAMINER BURD, KEVIN MICHAEL	
			ART UNIT 2611	PAPER NUMBER
			MAIL DATE 09/12/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/649,862	<b>Applicant(s)</b> LIU ET AL.	
	<b>Examiner</b> Kevin M. Burd	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 June 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 June 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

1. This office action, in response to the remarks filed 6/28/2007, is a non-final office action.

***Response to Arguments***

2. The previous objection to the drawings is withdrawn in view of the amendment.
3. Applicant's arguments filed 6/28/2007 with respect to the rejections of claims 1-22 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of the instant application's disclosed prior art and Tanaka (US 6,498,822).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over instant application's disclosed prior art (specifically figure 1B) in view of Tanaka (US 6,498,822).

Regarding claims 1-7, 16-22, the instant application's disclosed prior art discloses an apparatus for estimation of transmitter I/Q imbalance in a communication system in figure 1B. Signals are generated at a signal generator and input to MIX1 and

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MIX2. The signals are modulated in the mixers and transmitted. The parameters of the transmitter I/Q imbalance matrix can be estimated by transmitting two signals, each of which includes the power of the real and imaginary part in time domain, in two different periods (page 4, lines 15-24). The two modulation paths are combined in adder ADD1. In the demodulation of each signal received by the receiver, two orthogonal carriers are used to respectively demodulate the real and imaginary parts of the time domain signals from the received signal (page 4, lines 15-24). The signals are transmitted at different periods and will each be demodulated by I and Q carriers in MIX3 and MIX4. The instant application's disclosed prior art does not specifically state the first and second signals are symmetrical in the frequency domain. However, the instant application's disclosed prior art does disclose the system is an OFDM communication system. Tanaka discloses an OFDM process that arranges data in a frequency domain. Column 1, lines 18-44, discloses the OFDM receiver. A center position of the frequency distribution of a multi-carrier transmission is detected for acquiring frequency synchronization with the receiving signal (column 1, lines 37-44). The multi-carriers are arranged symmetrically to a center frequency of the OFDM signal in the frequency domain. By acquiring frequency synchronization in the receiver, the received information can be processed and recovered quickly. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the OFDM teachings of Tanaka into the OFDM system of the instant application's disclosed prior art.

Regarding claims 8, 10-12, 14 and 15, the instant application's disclosed prior art discloses an apparatus for estimation of transmitter I/Q imbalance in a communication system in figure 1B. Signals are generated at a signal generator and input to MIX1 and MIX2. The signals are modulated in the mixers and transmitted. The parameters of the transmitter I/Q imbalance matrix can be estimated by transmitting two signals, each of which includes the power of the real and imaginary part in time domain, in two different periods (page 4, lines 15-24). The two modulation paths are combined in adder ADD1. In the demodulation of each signal received by the receiver, two orthogonal carriers are used to respectively demodulate the real and imaginary parts of the time domain signals from the received signal (page 4, lines 15-24). The instant application's disclosed prior art does not specifically state the first and second signals are symmetrical in the frequency domain. However, the instant application's disclosed prior art does disclose the system is an OFDM communication system. Tanaka discloses an OFDM process that arranges data in a frequency domain. Column 1, lines 18-44, discloses the OFDM receiver. A center position of the frequency distribution of a multi-carrier transmission is detected for acquiring frequency synchronization with the receiving signal (column 1, lines 37-44). The multi-carriers are arranged symmetrically to a center frequency of the OFDM signal in the frequency domain. By acquiring frequency synchronization in the receiver, the received information can be processed and recovered quickly. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the OFDM teachings of Tanaka into the OFDM system of the instant application's disclosed prior art.

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Regarding claim 9, the instant application discloses the signals are transmitted at different periods and will each be demodulated by I and Q carriers in MIX3 and MIX4.

Regarding claim 13, page 3, lines 26-30, discloses the estimation of the parameters is done before IFFT.

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-3008. The examiner can normally be reached on Monday - Friday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on (571) 272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin M. Burd  
9/5/2007

  
**KEVIN BURD**  
**PRIMARY EXAMINER**